The Scientific Review,

AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

REGISTERED FOR TRANSMISSION ABROAD.] **Journal of the Inventors' Institute.** [ALL RIGHTS RESERVED.

VOL. XVII.—NO. 2.] FEBRUARY 7, 1882. [PRICE 6d.

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⁂ *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

A Patent has been granted to Mrs. Helen M. Snyder, of Pine Bluff, Ark., for an improvement in *preparing, painting, and mounting photographic pictures.* The object of the invention is to produce coloured photographic pictures mounted on plain or curved surfaces, and which shall be durable and superior in appearance. The invention consists in a process which is divisional into four parts—namely: First, saturating the picture by immersion in melted paraffin; second, heating by immersion in hot water to render the picture pliable and transparent; third, attaching the picture to heated glass coated with paraffin; and fourth, rubbing down the picture while kept warm. Photographic pictures thus prepared and treated are superior in transparency and beauty, permanent, of brilliant colour, and free from bubbles and discolourations; also, when painted on the face, give better opportunity for artistic work, and may be perfectly sealed to curved surfaces.

Mr. Ambrose A. Hastings, of Newark, N.J., has patented certain useful improvements in *lamps.* The object of this invention is to improve the light-giving qualities of lamps and secure greater safety in their use. To these and other ends the globe or part globe of the lamp is made of one piece with the oil chamber; the neck of the lamp, which is grooved, and the burner-collar, which is formed with a flange, have combined with them a rubber packing ring and a clamping plate secured by a nut, whereby the burner-collar is firmly connected with the lamp; the part globe, which is stationary, is formed with recesses, and has combined with it an upper removal part, and spring buttons applied to both sets of recesses to hold the two parts of the globe together, and whereby the upper part of the globe may be readily removed; also there is combined with the stationary part of the globe and the clamping plate a key for operating the stem of the wick feeder, held disengaged from said stem by a spring, whereby the wick can be adjusted without interfering with the removal of the burner.

Reviews.

DAPHNIS, AND OTHER POEMS.

"Daphnis, and Other Poems. By HENRY GEORGE HELLON. Kegan Paul, Trench, and Co., 1, Paternoster Square.

WE have before reviewed poems by Mr. Hellon, in which we foresaw germs of genius, and his poems have since occasionally appeared in our columns. That our opinion was not misjudged is evident from this most charming pastoral before us. Dr. Johnson's Prince in "Rasselas" soon found that he could not be a poet by imitation, and that he must seek the scenes of nature as a field for his imagination and fancy. It is from such sources as nature alone supplies that these poems are drawn. Taking the mythological story of Daphnis, the Sicilian shepherd, Mr. Hellon has woven words and similes into lines and stanzas of surpassing sweetness. The pastoral having been written for the musician Claudius Couldery, R.A.M., the author informs his readers that "in order to vary the melody, he has not adhered to the heroic verse usually recognised and employed by poets for narrative and pastoral subjects." The heroic verse is doubtless the noblest species of versification that out language affords, and with but few exceptions has been employed since Dryden for this class of poetry. It is difficult from the abundance of rich poetic passages this little volume contains, to give a true idea of its merits in a review, but we might take the following song of Daphnis as a bright example :—

"The bright dawn gilds the mountain's brow,
And sleeps the moon's pale sheen ;
Fair Eos sheds her radiance now,
While peep the stars between.
From slope to slope the waters play,
Or dance with childlike glee ;
And murmur music on the way
In ripples to the sea.

The white mist leaves the grassy glade,
Where beds of violets lie ;
The deer steal from the woodland shade,
The lark sings to the sky
A song, to woo me from my sleep—
A long melodious lay !
Ere angel-guards their vigils keep,
From dreams of night to-day."

There is a hunting song of Hermes, and others for Nymphs and Naiads of equal merit; but the finest we think is that where Daphnis is struck blind by the Naiad, and appeals to Hermes for assistance. The book also contains a very remarkable poem. The seer-mystical and prophetic, and of an entirely original character. It is written in the *tercet* or triplet, and is of some considerable length. Mr. Hellon goes so far as to assume that the North Pole is inhabited ; and that, too, by a race of superior intelligence to our own. It is obvious that some innate knowledge in man prompts him to explore the North Pole ; whereas the South Pole, which is equally unknown, seems to create no interest to the navigator. This poem, however, grapples chiefly with man's struggle with Nature and her God, in which the soul and spirit is ever seeking some ideal perfection. We give five stanzas :—

"I list the wild birds' plaintive strain ;
And ask, if Nature groan with pain,
Is love and sorrow all in vain ?

I watch the worm now moving crawl
Again within its prison wall,
And ask, is this the home of all ?

I know some purpose lives thro' all,
Some mighty purpose, yet withal
We live to-day, to-morrow fall !

These thoughts but leave the soul to dream,
Nor gather at life's ebbing stream,
Till darker Nature's mysteries seem.

But he whose spirits learned to pray,
Subdues the flesh from day to day,
Can see the light, and guide the way !"

There are other poems and sonnets. One of the former, a Requiem, is well conceived and touchingly written. The sonnet is now revived and is the most favourite form of poetry. In these Mr. Hellon has adhered to the Italian model ; they have a classical ring, and flow with passages of ideal song. To all lovers of poetry this volume will be welcome. It is well bound and carefully printed, and does credit both to the author and the publisher.

THE METAL TURNER'S HANDBOOK.

"The Metal Turner's Handbook, a Practical Manual for Workers at the Foot-Lathe, embracing information on the Tools, Appliances, and Processes employed in Metal Turning." By PAUL N. HASLUCK, author of "Lathe-Work," &c., with One Hundred Illustrations. London: Crosby Lockwood & Co., 7, Stationers' Hall Court, Ludgate Hill.

HAVING got this work only a short time before going to press we are unable to do more than place a brief *exposé* of its nature taken from the author's own words.

A few words explaining the object and scope of "The Metal Turner's Handbook" are desirable in introducing the work to public notice. It has been prepared in compliance with the wish of many who are engaged in the art of turning, and on the assurance that such a book is wanted.

My former treatise, "Lathe-Work," has received most flattering notices from the entire technical press of England and America. Practical turners have also favoured it with high praise and extensive patronage. I am, therefore, readily induced to respond to an urgent and wide-spread request to bring out "The Metal Turner's Handbook."

The object of the book is to provide a reliable and practical manual, replete with information on the art of turning, so far as it is applied to metal. By dealing with one section only, the subject may be more exhaustively treated upon. Metal Turning at the foot-lathe, both simple and complex, by hand and with self-acting motion, in iron, brass, and other metals, will receive the first consideration, and be comprehensively treated upon.

We may add, operations incidental to Metal Turning receive due notice. Various tools, processes, and appliances, useful and interesting to the Metal Turner are described ; and this is done without cramping the principal subject.

One hundred illustrations, and nearly one hundred-and-fifty pages of letter-press will embrace a large amount of information ; all those who occupy themselves, whether it be for pleasure or profit, in the practice of Metal Turning, will find something of interest.

We can add that the book is full of real practical information well placed before the reader.

CONSUMPTION.

"Consumption: a Reinvestigation of its Causes, showing it to arise chiefly from an Excessive Action of Atmospheric Oxygen. Its Dietetic, Climatic, and Therapeutical Treatment." By C. W. DE LACY EVANS, M.R.C.S., author of "How to Prolong Life." London: Bailliere, Tindall & Cox. 1881.

THIS work is on a subject which, as regards the general knowledge of diseases, is of an occult character. In the present treatise the object is to bring the matter to the test of practical science.

The authors on the nature, causes, and treatment of consumption, Mr. De Lacy Evans truly remarks, are many. The opinions held thereon are nearly as numerous as the expositors. Some of these are logical deductions from facts, and are therefore correct in principle. Others are theoretical, speculative, unprofitable, and often contradictory ; so much so, that Dr. C. J. B. Williams says, "The multitudinous facts and opinions with regard to Pulmonary Consumption are at the present day in a state of incomprehensible and unmanageable confusion. Any reasonable attempt to bring this chaos into order can hardly be objected to ; but the competency of any individual who makes the attempt may be fairly challenged."

Notwithstanding these judicious remarks, we venture to make such an attempt. Our competency shall be dependent upon results.

Hitherto the researches on consumption have been chiefly confined to pathology and histology, and so far so good ; but in the present work we have introduced the physiological chemistry of the subject, more than has hitherto been done, and which is a necessity to all researches on the fundamental causes of disease.

This at once gives a new line of inductive reasoning, based upon the data of a true and experimental science, and not upon theory or imagination. This we trust has enabled us to show that many of the views held by various authors on this disease are correct, but only as phenomena ; and although many of these differ from each other, these phenomena when correctly explained are all results of excessive oxidation of the animal tissues.

Oxygen is essential to health, and also to the normal changes in the human body ; but when its action becomes excessive, we have to combat an invisible enemy, which is generally looked upon as life's best friend.

A certain amount of repetition will be found, sometimes even of the same sentence ; but this may be considered a necessity when discussing such an important subject.

We only hope that this earnest effort on the part of the author will lead to a more true conception of the actual cause, and a more rational treatment dictated thereby, of a disease which is the cause of more than fifty thousand deaths per annum in England alone, nearly "half the deaths that happen between the ages of fifteen and thirty-five years," and which is "an enemy to mankind more deadly than War, Famine, or Pestilence."

Certainly the work before us is a practical essay quite understandable by anyone of general knowledge, and as far as non-medical readers are concerned likely to meet their approbation.

Our columns are not numerous enough to allow of any quotation being made ; we must be content with taking that part of the work which refers to the Symptoms of Consumption ; the Cause of Consumption ; the Primary Causes and Views of the Various Authors on Consumption. Also as to Climate Best Adapted to Consumption ; Diet Best Adapted for Consumption ; Treatment of Consumption. And a general summary of the views of the author concluding its pages.

WHAT INVENTION MAY DO A HUNDRED YEARS HENCE.

THE *Scientific American*, quoting from *The Hour*, has the following pertinent remarks :—

The possibilities of science when applied to the industrial arts are so very great that careful people hesitate to state them for fear of exciting ridicule. So, in articles which have recently been published in London as well as in New York, a humorous turn has been given to some of the possible results of inventions in these days.

Were an Englishman of the time of Elizabeth to have been told that water would be supplied to every house by means of pipes, that a combustible gas would be distributed in a similar manner from a central reservoir, that messages would be sent across continents and under oceans in a few minutes, he would have set down his informant as a lunatic, or, at best, the very wildest of dreamers. The man of to-day would be quite as incredulous if told what inventions and applications of science may do for the people of 1981.

One writer ventures to predict that in the twentieth century electricity will accomplish marvels which now seem too absurd to seriously set forth. Chops and steaks will be cooked by electric sparks so as to make the Frenchman's *cotelette à la minute* a reality. The fruits of the earth will be multiplied enormously by the use of electric light behind coloured glass. Fruits and vegetables will be grown all the year round, winter and summer, day and night, so that the field which now produces a hundred bushels of any product will yield ten thousand. We now cook our food, but take our air and water raw, and through these two elements come all the disorders and contagions which afflict humanity. In the future water will be distilled and prepared for human use, and thereby purified from all germs of disease, while air will not be breathed by human beings until it has been cleared of all noxious qualities, after which it will be admitted to the glass-covered streets and dwellings in which the man of the future will live. Houses and places of business will be situated in immense inclosed edifices, the air of which will not only be rendered wholesome, but delightful to the sense of smell. Summer and winter, so far as extreme cold or extreme heat is concerned, will be abolished, as the temperature can be controlled by artificial means, and all parts of the globe will become equally inhabitable. Day will have no attractions over night, for the artificial lights will be more pleasing than any which the great luminary of day can give us. Then, of course, the air will be navigated, which will help to change the appearance of the surface of the earth, for the great cities will then be situated on healthful hilltops, instead of on the insalubrious plains below. With the great motors shortly to be discovered, huge mountain chains which obstruct man's progress, in any direction can be levelled, while the ice packs around the two poles can be liquefied and made navigable.

All this seems wild enough, but no doubt very great changes will occur. If food can be produced by improved methods, with less cost, the problem of poverty is solved. If machinery continues to replace handwork, the hours of labour must be shortened and its value increased; but to accomplish this, a social revolution will be needed by which labour-saving machines will be worked for the benefit of the labourer, and not in competition with him

BONNEFIN'S SUGAR PROCESS.

Mr. Bonnefin does away with the cane mill, of which one-third of the power is wasted by putting it into motion, and the other two-thirds are unprofitably used in crushing the cane so imperfectly that a proportion of juice, equal to half the quantity extracted, is left and lost in the megass. He substitutes in its stead his "pulpifactor," which consists of two series of vertical saws specially made for cutting sugar canes, and fixed to two frames, the whole working by a reciprocating motion with but small power to lift the tool, which afterwards precipitates itself with its own power, increased by its weight and velocity. Each series of saws reduces at one stroke a bundle of ten canes into slices. These slices, falling into a disintegrator running at high speed, are reduced into a fine pulp, which is pressed by means of two small rollers. The whole of the juice is thus forced out of the cells, and the woody matter is removed in a dry state. The juice thus extracted is mixed with lime as each gallon is produced, and in a proper proportion as it runs to a continuous preparator, when it is heated in a few minutes up to 95° C., or 203° Fah., but never beyond this temperature. During this short time it is cleared of all the suspended matters. This is effected by passing the juice over a table constructed with a series of corrugations forming a long continuous passage, the heat being applied beneath the table. The suspended matters settle by gravitation and are deposited in pockets placed at intervals along the route the juice has to travel.

The juice is now in a favourable state of lightness, fluidity, and temperature for effective filtration in Mr. Bonnefin's capillary elastic filter. This filter consists of a series of metallic rings covered with india-rubber, the internal diameter being twelve inches. The rings are placed horizontally in a press, and over each alternate ring is hung a filter cloth made of pure unspun cotton of the finest fibre. The rings and cloths are closely pressed and held together by means of screws, their number being governed by the rate of filtration required. The syrup is pumped into the press and passes through the whole series of rings and cloths, the solid impurities being intercepted and retained by that portion of the filter cloth which covers the opening in the ring, while the syrup passes by capillary attraction through the surrounding portions of the cloth, and is delivered in a perfectly pure and clear condition at the outlet. The purified juice on leaving the filter is ready for treatment either in the ordinary way, by the vacuum process, or by Mr. Bonnefin's evaporator and concentrator, in which the process of crystallization is much more rapidly performed. In the evaporation the juice is quickly deprived of its contained water, while the concentrator brings it into the condition of sound sugar in a very short space of time. It is claimed by Mr. Bonnefin that by his process all the operations, from the moment the cane is placed in the pulpifactor to the time of the crystallization of the sugar, do not occupy more than one hour. This shows a marked advance upon the ordinary process, which occupies from six to twelve hours. The following are the chief advantages in favour of Mr. Bonnefin's process: With his pulpifactor and accessories he claims to extract from the cane all the saccharine juice. With his continuous preparator, he prevents acidity or fermentation, clears the juice of all the suspended matters, and prepares it for the operation of purification or refining. With his capillary filter he completely purifies the juice, and utilises all sediments and any washings of the factory. His aim is to make direct from the cane only one quality of sugar, that is, pure white refined sugar, to obtain the uncrystallizable sugar clear and bright, notwithstanding the colouring matters and the foreign salts, and to do this with a palpable economy of time, labour, fuel, machinery, and buildings.

THE PATENT LAWS.

A meeting of the Inventors' Institute was held on January 12 for the purpose of discussing the Patent Laws, at the offices of the society, 4, St. Martin's-place, Trafalgar-square, Mr. Faulding presiding.

Previous to commencing the discussion, the Chairman referred in feeling terms to the death of the late president, Sir Antonio Brady, and moved that a letter of condolence be addressed from the Institute to the bereaved family of the deceased.

Mr. Greenfield seconded the motion, which was unanimously carried.

Mr. F. W. Campin, the secretary, referring to the Patent Bill drawn up by the Council of the Society of Arts, said Sir Frederick Bramwell and some of his friends had played a very considerable part in the bill, which, in his opinion, had not been drawn up in the interest of inventors. It was very like a bill the Institute proposed 12 years ago, but things had so altered since then that such a bill would be of very little use now. He ventured to think the bill would not receive the support of any member of the Institute, and it appeared to him that the best thing they could do was to take up that of Mr. Anderson, M.P., and give it their support.

Mr. Stansfield hoped the Institute would not support Mr. Anderson's bill, because it did not reduce the fees low enough. What they really wanted was a patent law that would give patents for the actual cost. Was it fair, he asked, that English inventors should be handicapped 25 to one against the Americans? Mr. Anderson's bill certainly reduced the fees, but they would still be handicapped 12½ to one, and he ventured to think no inventor would agree with such a law as that. Neither of the bills referred to represented the inventors, and he suggested that a bill should be drawn up by the Institute. The inventors of England had been the means of bringing the country to its present state of prosperity. Many statesmen had gone to the grave crowned with honours that had been won by inventors, and their inventions had so improved transit and machinery that a famine in England was simply impossible. This being the case, he contended that inventors had a right to be treated with consideration and fairness. With regard to the bill of the Society of Arts, he was bold enough to say the interests of lawyers and patent agents only had been considered.

Mr. Le Grand agreed entirely with the first part of Mr. Anderson's bill, as it would be an improvement on the present law. He held several patents himself, and would have several others if it was not for the heavy fees. He had to wait several years before he could patent his first invention, because he had not the means, and he was all that time running the risk of someone else bringing out the same invention. He was not a poor man, but the fees were so heavy as to make him hesitate before patenting any other of his inventions.

Mr. Paterson was entirely in favour of very low fees, but Mr. Anderson's bill was a very great improvement of the law as it stood at the present, and it should, therefore, receive the very cordial support of the Institute.

Mr. Stansfield moved that it be an instruction to the council to prepare a bill dealing specially with the fees, and asking that they should only be a little more than to cover the actual expense of the patent.

Mr. Zingler seconded the motion.

Mr. Le Grand moved, as an amendment, that the Institute draw up a memorial embodying the reforms which they thought should be made in the present law.

Mr. Paterson seconded this, because they would be able to express their views more fully than in a bill.

Mr. Stansfield withdrew his motion in favour of the amendment, which was carried unanimously.

In the course of some further discussion the meeting expressed its view that the length of a patent's term should be 21 years. A vote of thanks was then accorded to the chairman, and the proceedings terminated.

Use of Salicylic Acid.—M. Pasteur considers that the use of salicylic acid in articles of human consumption is permissible, but that its presence and exact proportion should always be declared.

THE ANALYSIS OF POTABLE WATER

By Mr. CHAS. W. FOLKARD.

AT the Ordinary Meeting of the Institution of Civil Engineers, on Tuesday, the 24th of January, Mr. Brunlees, Vice-President, in the Chair, a Paper was read on "The Analysis of Potable Water, with special reference to the determination of Previous Sewage Contamination."

In the first place, the author reviewed the present state of analytical chemistry, the conclusion being that, as far as mineral substances were concerned, the existing methods were nearly perfect. But when organic analysis was considered, a different state of things was apparent, owing to the great number, complexity of structure, and unstable nature of many organic bodies, especially those contained in the secretions and tissues of plants and animals; in addition to which organic matter was present in drinking water in very small quantities, and always more or less mixed with other substances.

The subject might be divided into four parts:—1. The various ways in which water became contaminated. 2. The methods employed by analysts to detect and determine the extent of this contamination, with an opinion as to the probable value of these methods. 3. The bearing of the results of biological and microscopical investigations on the subject. 4. The utility of irrigation, chemical treatment and filtration, for purifying purposes.

Under the first of these heads, the normal constituents of rain-water were considered, all of which were practically harmless, so that rain-water as it fell on the earth, or on the gathering grounds of a system of water-supply for a town, was unobjectionable, having contracted but an inappreciable amount of contamination. Spring water was not so pure, owing to its percolation through strata from which various mineral substances were dissolved. River-water was the most objectionable, on account of the enormous quantities of animal and vegetable contamination which it acquired. Lastly, well-water varied greatly in quality, in some cases being excellent where the wells were deep and surface water was excluded, or when the district was thinly peopled; in other instances well-water was more contaminated than river-water, as in shallow wells in towns.

Under the second heading, the author pointed out that analytical chemists had hitherto been compelled to be content with the examination of the products of decomposition, or with the determination of one or two constituent elements of the organic impurities of water. Unfortunately the products of decomposition of the organic matter in water were the same as the normal constituents of rain, viz., carbonic acid, ammonia, and nitric acid. It was therefore impossible to ascertain whether those substances were derived from contaminating bodies or had been dissolved by the rain in falling.

The various processes of Water Analysis were then considered. In the first and oldest method a measured quantity of water was evaporated, and the residue was subjected to a red heat in a platinum dish. By this treatment the animal and vegetable substances were burnt away, and from the loss of weight, the amount of organic matter was inferred. One great objection to this and the following process was the evaporation of the water. With such unstable bodies it was by no means improbable that a large portion was destroyed during the process.

By the second method the solid matter, left after evaporation of a known quantity of the water, was mixed with an oxidizing agent and heated to redness in a glass tube. The carbon and nitrogen of the organic matters in the residue were obtained in the form of carbonic acid and nitrogen gases, from which were deduced the weight of carbon and of nitrogen present as organic matter in the residue. This ratio of carbon to nitrogen did not, however, afford the slightest clue to the identity of the organic matter. It might be intensely poisonous or dangerous, or, on the other hand, harmless.

The albumenoid-ammonia method consisted in boiling the water with an alkaline oxidizing agent, by which the organic matter was decomposed, and part of its nitrogen evolved in the form of ammonia. This had the great advantage of simplicity of manipulation, and was not open to the objection that previous evaporation was required.

The last considered was the permanganate method. In this the index of impurity was the amount of oxidizing agent, namely, permanganate of potash, required to destroy the organic matter in the water. Inasmuch, however, as no relation had been established between the oxidability of a body and its action on the animal economy, this method would not afford reliable evidence of the fitness of a sample of water for drinking purposes or the reverse.

Under these circumstances the conclusion seemed inevitable, that the subject was as yet beyond the power of the analytical chemist.

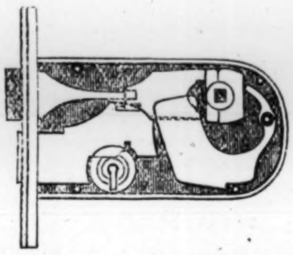
It was, however, possible, by the second method, to determine approximately the minimum amount of contamination which had taken place since the water was precipitated as rain. For this purpose the whole of the nitrogen existing in the water was estimated, and the average amount in rain falling on the surface of the earth deducted. The remainder was due to animal and vegetable contamination, and it had been found convenient to express it in parts of average London sewage; that was to say, the sample was returned, as having been contaminated to the same extent as if pure rain-water had been mixed with so many parts of ordinary sewage. But this afforded no direct evidence as to its fitness for dietetic purposes because subsequent oxidation and fermentation might have rendered the water to a great extent harmless.

The Author next considered the bearing of biological research on the subject, pointing out that mere dilution had an almost inappreciable effect in disarming the germs of disease of their power. Thus, supposing a glass of water to contain but one germ, if the person taking it was sufficiently unhealthy or weakly, he would contract the disease almost as certainly as if there were hundreds of germs. In the Author's opinion it would be impossible to banish zymotic disease from towns, the water supply of which contained the dejecta of persons suffering from the disease, even though present in the most minute quantity. The very weakly would contract the complaint from the water, and from them it would spread to the more robust around them. Again these germs were endowed with such persistent vitality, that they withstood the effects of heat and cold, moisture, drought, and chemical agents to an almost incredible extent, affording what seemed, at first sight, indisputable evidence of the now exploded doctrine of spontaneous generation. From this it appeared that once-contaminated water was unsuitable for dietetic purposes.

In conclusion, the Author contended that a radical change was the only remedy. Irrigation and chemical treatment were alike powerless; in addition to which, during heavy rain all existing sewerage systems were incapable of dealing with the huge volumes of water poured into them, and the sewage was allowed to flow direct into the river, to the manifest disadvantage of the towns below, who were dependent upon it for their water supply. Filtration, again, was powerless to effect real purification. The germs of disease were so minute that they could pass one hundred abreast through the interstitial spaces of ordinary sand, and dissolved substances were of course unacted upon. In view of the great increase in cancerous diseases of the stomach and intestines, the subject was worthy of the most careful study, and taking into consideration the unreliability of the results afforded by chemical analysis, the only way to ascertain if a sample of water was fit for drinking purposes was, in the Author's opinion, to trace it to its source, and see that contaminating matter was excluded, from the time that the water fell as rain till it entered the reservoir or engine-well.

WHITE'S PATENT SPRINGLESS LOCK.

WE have received a communication from the inventor calling attention to the fact that the woodcut in the notice in our last issue is placed incorrectly. We therefore re-insert it as it should have appeared.



IMPROVEMENTS IN VENETIAN BLINDS.

AN invention termed the "Venetio" (Mr. Seymour's, of 16A, Southwark Bridge-road), has been recently patented in France and Belgium, as well as in England, for the purpose of fixing the webs and cords to Venetian blinds without having to nail them to the top and bottom bars, as at present is the case. This invention appears likely to come into general use, as it provides an easy method for taking the laths of Venetian blinds out for cleaning, or for replacing new tapes for old. Venetian blinds, as in present use, have a somewhat unfinished appearance, owing to the tapes being nailed to the top and bottom bars. The "Venetio" obviates this, and gives a finished and ornamental appearance to the blinds. The patentee's eye-bolt, which secures the cord, is also a very ingenious contrivance, as from its shape and make it can be drawn freely through the holes in the laths without detaching the cords from them. In refixing it is simply passed back through the holes in the laths and bottom bar; an ornamental nut is then screwed on, when the adjustment is complete. It needs no saying that many persons in the spring of the year put their curtains up without cleaning their Venetian blinds simply for the reason of saving themselves the trouble of refixing with nails, or to avoid the expense of calling in a blind maker. Henceforth no such trouble can arise where the patent "Venetio" is fixed.

We understand from the inventor that the blind makers do not take kindly to its introduction, no doubt owing to the circumstance that where brought into use their services will not be so frequently required to re-tape and re-paint Venetian blinds, and as any carpenter can fix the "Venetio" this may be another reason for their objection to its introduction. The inventor and patentee seems, however, to have studied the public good, and therefore deserves some encouragement for his labour. It is a fact worthy of notice that numerous useful inventions which affect the trade of a particular class, but where expense to the public is saved by such invention, have ultimately to either adopt it, or stand on one side in order that other trades—for instance, ironmongers—may receive the profits by its sale.

The Scientific Review

AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN

ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

JOURNAL OF THE INVENTORS' INSTITUTE,

(*Established* 1865.)

Is published in the first week of every month at the

OFFICES, 21, COCKSPUR STREET, CHARING CROSS, LONDON, S.W.

The Scientific Review will be sent post free on prepayment of the Annual Subscription of 6s. 6d.; or it may be had wholesale from Messrs. KENT and CO., Paternoster Row, or through any Bookseller or Newsagent in the kingdom, price 6d. per copy. Single copy post free from the office, 6½d.

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Subscriptions are payable to Mr. G. A. Stretton, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. Campin, Sec.

SESSION 1881—1882.

The meetings during February will be Patent Law Conferences.

The Meeting held in January received the report by the Secretary of the death of the President (Sir Antonio Brady), and adopted a vote of condolence to his relatives. The Patent Laws were considered, and it was agreed a Bill should be draughted.

Monthly Notices.

Mr. Harrison Ainsworth, the veteran novelist, has not long survived the publication of his recent novel. In him has passed away the last of the historical romancers who received their impulse from Scott. Mr. Ainsworth has had probably the longest career of any English novelist. His first fiction appeared in 1825 and his last in 1881.

Prof. Henry Draper, the author of the well-known "History of the Intellectual Development of Europe," is deceased. Dr. Draper was educated at the University of London, but emigrated to the United States in 1833, where he speedily acquired a reputation as a chemist. He was the father of the distinguished astronomer.

The Electrical Storage Battery.—Mr. Sutton, of Ballarat, has improved his electrical storage battery by a newly constructed cell, which he describes as a flat copper case shaped as a Grove's cell. From his lid of paraffined wood hangs a plate of mercury-amalgamated lead. The liquid with which it is charged is a solution of cupric sulphate containing one-twelfth of hydric sulphate. "The presence of this free sulphuric acid," writes Mr. Sutton, "improves the cell at once."—*Athenæum.*

Mr. Robert Calvert Clapham, of Earsdon House, Newcastle-on-Tyne, died at Winchelsea on the 22nd of December, 1881, aged fifty-eight years, Mr Clapham has long been associated with the alkali works on the Tyne, and his abilities as a chemist were constantly available for the improvement of the soda manufacture. The Philosophical Society of Newcastle-on-Tyne, of which he was for many years secretary, was always indebted to him for his active exertions. The Chemical Society of Newcastle, to which he contributed several papers on chemical subjects, owes its origin mainly to Mr. Clapham. A valuable paper "On the Theory of the Formation of Sulphur in Volcanic Countries," in the *Tyneside Natural History Transactions*, and numerous papers in the Reports of the British Association, the *Chemical News*, and the *Geologist* show the activity of Mr. Clapham's mind. There was no educational question in which he did not take a prominent part, and, having long been the Technological Examiner on Alkali Manufacture of the Society of Arts, he gave his services to the City and Guilds of London Institute when that institution was established.

Anemometers—The Council of the Meteorological Society will hold an exhibition of anemometers at the Institution of Civil Engineers on the evening of March 15th next. The committee are anxious to obtain as large a collection as possible of various patterns of anemometers, either full size, models, photographs, or drawings.

Constituent of the Atmosphere which absorbs Radiant Heat.—At a recent meeting of the Royal Society, the author, Mr. S. A. Hill, Meteorological Reporter for the North-West Provinces and Oudh, discusses in his paper the observations made at different altitudes in India, and finds generally that they indicate the vapour of water as the constituent in question. He calls attention to the observations made at Grenoble in 1875 by Prof. Violle, simultaneously with observations taken at the Glacier des Bossons, the Grands Mulets, and on the summit of Mont Blanc, which support the water-vapour theory. Physicists and meteorologists will learn with satisfaction that a series of observations will be undertaken this year at Leh, 11,500 feet above the sea. As that elevation overtops four-fifths of the absorbent atmosphere, it may be expected that the problem whether the sun's heat varies with the altitude or not will be settled. In any case comparison of the Leh observations with those to be made on Mount Whitney (United States) by Prof. Langley (as we have mentioned elsewhere) will hardly fail to yield data of great importance and value for future investigations.—*Athenæum.*

Actinium.—Dr. T. L. Phipson, in *Comptes Rendus*, 93, describes the new metal, "actinium," which he has detected in a zinc pigment, which darkens on exposure to light. He has been successful in separating this metal from the zinc pigment, which contained as much as four per cent. of it in the condition of a canary-yellow sulphide. This sulphide of actinium rapidly darkens on exposure, becoming quite black in sunshine, but when covered with a piece of glass it remains unchanged.

THE SCIENTIFIC REVIEW

AND

Scientific and Literary Review

INCORPORATING THE "JOURNAL OF THE INVENTORS' INSTITUTE."

FEBRUARY, 1882.

SCIENTIFIC HEATING.

An Exhibition is being held of heating by stoves and other such like appliances as are intended to secure the abatement of smoke and other objectionable results of coal burning. Now this matter must, to the dwellers in the great metropolis, be a subject of the highest interest, for we Londoners all know how much our garments are soiled, our household furniture deteriorated, our respiratory organs affected, and many objections engendered. And though, as some of our *savants* will have it, fog is merely an offspring of smoke, though anyone who knows London well knows that mist and fog hang on the river Thames when there is little or no fog in the streets and houses. But be this as it may, chimney smoke is a great evil, and if it can be removed it should be, provided of course its removal would not require systems of operation which would place each one of us in the position of a dependent, or what may be termed gangs of conspirators for gas or for hot air circulation from sectional or district hot air generating furnaces. Everybody likes to heat his house in his own fashion; one man's notion of comfort as to warmth being different to another's.

Many of the stoves before the public are fuel economizing and more or less smoke abating. As possessing scientific points of importance there are Ritchie's stoves, and for decided peculiarity of character is the Acetate of Soda Stove. Two methods of utilizing acetate of soda for warming purposes are before the public; the original invention of M. Ancelin, in which acetate of soda alone is used, and a modification recently patented by Herr A. Nieske, a chemist of Dresden. The *English Mechanic* says that the former has been taken up by the London and North-Western Railway Company, who have a license for three thousand foot warmers, but according to the statements made, the invention of Herr Nieske is in some respects superior. It appears that two of the soda salts are peculiarly adapted to the purpose, namely, the hyposulphite and the acetate. The first-named salt has the property of melting easier than the latter, consequently, when the hyposulphite of soda is mixed with acetate of soda, the former prevents the latter from crystallizing too rapidly, The two salts combine and form a permanent filling, so that the reservoirs, vessels, or receptacles containing the same can be soldered down, and thus hermetically closed. Herr Nieske has found it preferable to employ the following proportion of the salts; one part hyposulphite of soda to ten parts acetate of soda. The reservoirs or receptacles are filled to about three parts full, and the lid soldered on. In order to prepare the reservoirs for employment they are placed in boiling water until the filling is melted; this is readily ascertained by shaking the reservoir or vessel, which can be modified in form according to the purpose for which it is used.

A "stove" which is suited for employment in bedrooms, sick rooms, offices, dwelling and other rooms, is placed on three or more feet with casters, so as to enable it to be easily transported from one place to another. It has a vessel of cylindrical or other suitable form, and a perforated mantle forming the outer walls of the stove. The reservoirs, filled with the soda salts above named, are arranged between the vessel and the perforated mantle of the stove. They are of such size that they can be inserted in the central vessel by means of their handles. The stove is closed by a cap and lid, which can be readily removed. The water in the vessel can be brought to a boiling point by means of a burner in connection with a gas pipe, or by other means.

As soon as the water in the vessel has been brought up to the boiling point, the reservoirs which contain the soda salts are inserted until the salts contained in them are melted. The reservoirs are then replaced in their former position between cylinder and mantle, and emit the heat they contain so gradually and equably that the filling even after a lapse of from ten to twelve hours is found to be warm. The cylinder or vessel can be entirely removed from the stove, and the reservoirs heated, or the soda salts contained in the same melted in any suitable boiler or similar receptacle; or the vessel can be heated in any other suitable place. The cylindrical vessel is for this purpose provided with a projecting ring or flange, which lies on three supports or brackets, which also serve to support the reservoir. The evaporation of the water in the vessel prevents the air in the room becoming too dry. For foot-warmers, tubing or pipes run through the filling so as to attain a greater surface for the emission of warmth; such foot-warmers retain their warming properties for about twelve hours. Stomach, chest, and other warmers can be employed with the same filling, and are adapted for employment in hospitals, sick rooms, and such like. The warmth emitted by these reservoirs is especially beneficial to patients, as the heat remains equable, continues for several hours, and is not only agreeable but beneficial. Another application to which this class of warmth reservoir can be put is to place the same within a nickeled or other suitable ball, which can be easily carried in a muff, overcoat, etc., and can be held in the hand when skating, riding, driving, walking, and so on, in cold weather. They can also be most advantageously employed for artificial breeding apparatus or incubators, as the warmth remains continuously the same, and is therefore the best substitute for the natural warmth of the blood.

Proceedings of Societies.

SOCIETY OF ARTS

DEC. 12.—Mr. T. Bolas gave the fourth and concluding lecture of his course of Cantor Lectures "On some of the Industrial Uses of the Calcium Compounds."

DEC. 14.—Sir F. Bramwell in the chair. Mr. W. H. Preece read a paper "On Electric Lighting at the Paris Electrical Exhibition," A large number of incandescent lamps on the Edison system were shown in action, the current being obtained from a machine working at the end of the Adelphi arches near the Embankment.

LINNEAN SOCIETY.

DEC. 15.—Mr. G. Busk in the chair.—Messrs. W. H. Coffin, E. Milner, and S. H. Parkes were elected Fellows.—Prof. T. S. Cobbold exhibited a large guinea-worm (Dracunculus) taken from a pony and forwarded by Mr. F. Smith from Madras. Only one previous instance of the occurrence of this parasite in the horse has been mentioned, and its authenticity was doubted by Fedschenko and other helminthologists.—Mr. G. S. Boulger brought before the meeting a set of large papier-maché models of insectivorous plants made at Breslau by Herr Brendel under the superintendence of Prof. Cohn. Mr. Boulger explained their adaptation for teaching purposes, and made special reference by a diagram to the various stages and physiological distinctions of these plants, viz., from simple viscidity of surface to the more complex apparatus in Dionæa and Aldrovanda.—Mr. Christy called attention to a volume of the Annual Report of the Commissioner of Agriculture, Washington, U.S. (1879), wherein was embodied much valuable information on the insects and parasites injurious to crops, &c.—Prof. Duncan gave the gist of a paper "On the Morphology of the Test of the Temnopleuridæ." He described a remarkable mode of junction of the sutural grooves and depressions at the angles of the plates in *Salmacis sulcata*, and in other forms alternate development of knobs and sockets on each plate corresponding to its opposite fellow. He traced this in different stages in both young and older specimens, and showed that the peculiarities of structure may affect their classification.—A paper by Dr. M. Masters followed, dealing with a new species of cotton (*Gossypium Kirkii*) from East Tropical Africa. It has an interest historically from being probably the origin of very numerous cultivated varieties. It was obtained by Sir John Kirk growing wild at Dar Salam. Dr. Masters regards it as nearly allied to *G. Barbadense*, which is commonly cultivated in Tropical Africa, although along the Nile valley *G. herbaceum* is that usually in cultivation. According to authorities cotton was not cultivated in Egypt in ancient times; and the fact that the varieties now grown there are for the most part forms of *G. herbaceum* suggests the idea that India is the source whence Egypt has derived the cotton—a notion confirmed by various other considerations. The wild form of *G. herbaceum* Dr. Masters has previously shown is probably *G. Stocksii*, Masters, a native of Scinde.—A note on *Abies Pattonii*, Jeffrey, MS., 1851, by Prof. W. R. NcNab, was then read. The author mentions that the trees known as *A. Hookeriana* and *A. Pattonii* have been a source of confusion to botanists and horticulturists. A. Murray, in 1855, in describing a new North American pine, mixed up the leaf of *A Pattonii*, Balfour, from Mount Baker, with the cone of *A. Hookeriana* from Scots Mountain, Oregon, originally collected by Mr. John Jeffrey. Dr. McNab, in unravelling the error, proposes that as Jeffrey's No. 430, from the Cascade Mountains, named by Balfour *A Pattonii* in the Oregon circular, was unpublished, it should now be referred to *Tsuga Hookeriana*, and the Mount Baker tree be regarded as *T. Pattoniana*.—There followed a paper, by Dr. G. E. Dobson, "On the Digastric Muscle, its Modifications and Functions:" and the eleventh part of the "Mollusca of the Challenger Expedition," by the Rev. R. Boog Watson, which latter was read in abstract.

ZOOLOGICAL SOCIETY.

DEC. 13.—Prof. W. H. Flower, President, in the chair.—The Secretary read a Report on the additions to the Menagerie made during November.—Mr. Sclater exhibited two skins of a Rail from Macquarie Island, south of New Zealand, sent to him by Sir G. Grey; and Mr. H. Seebohm specimens of the Rusty Grakle (*Scolecophagus ferrugineus*) ann Pallas's Great Grey Shrike (*Lanius major*), which had been shot near Cardiff, and were new to the British avifauna.—Communications were read: from Mr. C. R. Markham, on the former whale fishery of the Basque provinces of Spain,—by Messrs. J. J. Lister and J. J. Fletcher, on the condition of the median portion of the vaginal apparatus in the Macropodidæ,—and from the Rev. Canon Tristram, on a new fruit-pigeon of the genus Carpophaga, from the Louisiade archipelago, which he proposed to name *Carpophaga Salvadorii*.

CHEMICAL SOCIETY.

DEC. 15.—Prof. Roscoe, President, in the chair.—The following papers were read: "On some Higher Oxides of Manganese and their Hydrates," by Mr. W. H. Veley.—"On a New Alkaloid from Chinchona Bark," by Messrs D. Howard and J. Hodgkin, The authors have extracted from the bark of the China Cupræa an alkaloid closely resembling quinine in its general properties. It differs in the solubility of its salts and the readiness with which the alkaloid crystallizes from ether. They have named it homoquinine.—In the discussion which followed this paper Mr. Cownley mentioned that he, in conjunction with Dr. Paul, had separated apparently the same alkaloid, and that their results would be published in the next number of the *Pharmaceutical Journal*.—"Contributions to the Chemistry of the Rare Earth Metals," by Mr. B. Brauner. This paper gives an account of a most thorough investigation of some compounds of cerium and didymium, and the determination of the atomic weight of lanthanum. The author has prepared a tetrafluoride of cerium and a pentoxide of didymium. He places these metals in the eighth series (horizontal) of Mendeljeff's system thus: cæsium, 133; barium, 137; lanthanum, 139; cerium, 141·6; didymium, 146·6.

PHILOLOGICAL SOCIETY.

DEC. 16.—Mr. A. J. Ellis, President, in the chair.—Lieut.-Col. Spalding wss elected a Member.—A paper by Mr. T. Powell, M.A., was read by Mr. Sweet, "On the Treatment of Borrowed English Words in Colloquial Welsh." Going through the consonants one by one, Mr. Powell noted how they were changed in his Dimetian dialect, that of East Brecknock and West Cardigan, *b* going into *p*, *v* often into *m*, as *marnis* for "varnish," &c.—Mr. Powell was asked to complete his paper by adding the vowel-changes, so that then it might be printed. —Mr. W. Jones, who compared these Mid-Welsh changes with those in Anglesea, undertook to prepare a paper on the Anglesea dialect for the Society's meeting on June 2.—Mr. H. Sweet then brought forward for discussion some points in the new English grammar he is preparing: that the word "case" should be confined to changes of form; that the old term "genetive case" should be retained; that "pronouns" were, in fact, "general nouns," and should be so called; and that a class of "general adjectives" should be constituted for the non-qualitative ones, like "all," "every," "each," &c.

PHOTOGRAPHIC SOCIETY.

DEC. 13.—Mr. J. Glaisher, President, in the chair.—The following papers were read: "Halation," by Capt. Abney. This was shown not to arise from any turbidity in the glass, but from light being reflected from the back of the plate, one prevention being asphaltum dissolved in benzole applied to the back of the plate.—"On an Improved Sensitometer," by Messrs. J. D. Mucklow and J. B. Spurge. The light, admitted through holes decreasing in size, passes through dark cells on to a sensitive surface, the strength of the light being determined by the smallest hole it can pass through.—"Coloured Transparencies from Silver Images," by Mr. G. R. Woods.

ANTHROPOLOGICAL INSTITUTE.

DEC. 13—Mr. Hyde Clarke, V.P., in the chair.—The election of Mrs. C. Hancock was announced,—The discussion on the Rev. R. H. Codrington's paper "On the Affinity of the Melanesian, Malay, and Polynesian Languages" was continued by Mr. A. H. Keane and Mr. Hyde Clarke.—Mr. M. J. Walhouse read a paper "On some Vestiges of Girl Sacrifices, Jar-burial, and Contracted Interments in India and the East." The great megalithic forms of interment, consisting of kistvaens, or sepulchral underground chambers, formed of four huge slabs, covered with an immense capstone, and surrounded by a circle of standing stones, abound in nearly all the provinces of the Madras Presidency; but besides these there is another description of burial, peculiar to the region of the western coast from Malabar to Cape Comorin. This consists of huge mortuary jars or urns, pear-shaped, usually about five feet high by four feet in girth round the shoulders, and tapering to a point at bottom. They are of coarse, thick red ware, wide-mouthed, generally with a rude incised cross-pattern round their neck. These great urns are buried upright in the ground, not in any cist or chamber, and a large flat stone or slab is laid over them, but no circle of stones ever placed around. They are filled with earth, and contain at the bottom a quantity of bones broken small, some bits of iron, and occasionally a small urn also filled with bits of bone, or sometimes with clean sand, red or white, which must have been brought from a distance.—Mr. G. Bertin read a paper "On the Origin and Primitive Home of the Semites," which was followed by a discussion.

TELEGRAPH ENGINEERS SOCIETY.

DEC. 15.—Annual General Meeting.—The following gentlemen were elected as the Council of the Society for the ensuing year: —President, Lieut.-Col. C. E. Webber; Vice-Presidents, Messrs. W. Smith, Prof. W. G. Adams, C. E. Spagnoletti, and Prof. D. E. Hughes; Hon. Treasurer, E. Graves; Hon. Secretary, Lieut.-Col. F. Bolton; Council, W. S. Andrews, W. T. Ansell, Sir C. Bright, E. B. Bright, Earl of Crawford and Balcarres, H. G. Erichsen, H. C. Forde, M. Gray, J. F. Moulton, A. Siemens, A. Stroh, and C. F. Varley; Associate Members of Council, Capt. J. T. Bucknill, T. R. Crampton, and C. H. B. Patey.

HISTORICAL SOCIETY.

DEC. 18.—Dr. Zerffi in the chair.—Mr. Hyde Clarke read a paper entitled "Notes on the Ligurians, Aquitanians, and Belgi."—The second paper was by Mr H. E. Malden, entitled "History on the Face of England." —In the discussion which followed Dr.

Zerffi, Messrs. Pfoundes, Pagliardini, Hunt, and Alexander took part.

FOLK-LORE SOCIETY.

Dec. 16.—Mr. W. R. S. Ralston, V.P., in the chair.—Mr. Karl Blind read a paper "On some Finds in Germanic and Welsh Folk-lore." After detailing a number of strange cat stories, their connexion with the old circle of Vaenir deities was shown: the Irish Brendan and other legends were adduced by way of comparison. The strong influence of the Teutonic element on the water tales of South Wales by the Flemish immigration and by the older Norse invasions, and the probable Germanic character of the Finn or Fionn race, which in mythic times is found in Ireland, Britain, and Norway, formed another part of the lecture. Several of the Welsh tales were gathered from more than octogenarian people. Mr. Karl Blind remarked that these waifs and stays, this flotsam and jetsam of an ancient water cult, should be collected whilst there was yet time.—Among those who took part in the discussion which followed were Messrs. Alfred Nutt, Fitzgerald, Vaux, Pfoundes, and the Rev. J. Long.

GEOLOGICAL SOCIETY.

Dec. 21.—Mr. R. Etheridge, President, in the chair.—Messrs. C. D. Barstow and J. Lundy, were elected Fellows; and Prof. E. D. Cope, of Philadelphia, a Foreign Correspondent.—The following communications were read: "The Torridon Sandstone in relation to the Ordovician Rocks of the Northern Islands," and "The Precambrian (Archæan) Rocks of Shropshire," Part II., by Mr. C. Callaway,—"The Red Sands of the Arobian Desert," by Mr. J. A. Phillips, —and, "Analyses of five Rocks from the Charnwood Forest District," by Mr. E. E. Berry, communicated, with notes, by Prof. T. G. Bonney.

SHORTHAND SOCIETY.

Jan. 3.—Mr. C. Walford, President, in the chair.—The following new Members were elected: Messrs. T. R. Wright, H. Findon, H. T. Humphries, W. C. Hill, L. G. Gowing, H. Gerrans, A. E. Cope, E. W. Toye, and J. M. Cook.—The Rev. W. H. Hechler, V.P., read a paper from M. L. P. Guénin, revising stenographer in the French Senate and Foreign Associate, "On the Origin of German Shorthand Systems," with more especial reference to the theory put forth by Dr. Krieg as to the origin of Gabelsberger's system. Dr. Krieg having stated in his "Cours de Stenographie Internationale" that Gabelsberger's system was original, and that his aim had been to produce a scientific system based on a resemblance of his characters to the natural movements of the vocal organs, M. Guénin pointed out that he had discovered a similarity between the system of Gabelsberger (1831-4) and that of Richard Roe (1802), and a still more remarkable likeness between the German method and that of Oxley (1821). M. Guénin therefore ascribed the origin of the "script" system, in which all the characters slope in the direction of those of the common running hand, to Roe, and asserted his opinion that Gabelsberger had obtained his general idea from Roe and Oxley, but more particularly from the latter author.—In the discussion which followed it was admitted that Gabelsberger had been anticipated in the "script" style of writing by Roe and Oxley, but on the question of plagiarism from the English system there was a diversity of opinion.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

Jan. 4.—Mr. W. H. Cope in the chair.—Mr. W. G. Smith exhibited a number of prehistoric hammers, principally Irish, formed of hard pebbles of circular form, all of which had been bored for the passage of the handles.—Mr. J. T. Irvine communicated a description of the font of Ebchester Church, a small early bowl on a circular shaft, the stone probably derived from some Roman building, being similar to that in the Roman remains around the church. He also described some artistic carving of the same date, found recently at Bath among the remains of the great bath close to the Abbey Church. In this building stone blocks have been found, most probably intended as pedestals for statues.—Major di Cesnola, in continuance of his recent exhibition, described a series of terra-cotta statuettes from Cyprus. One of the figures had a very apparent resemblance to the Venus de Milo, and in the discussion which followed the similarity of design observable in many of the ancient statues was dwelt upon.—Mr, A. Chasemore exhibited a series of tradesmen's tokens of the seventeenth century, mostly from Westminster and its neighbourhood; among these being one of the King's Arms, Fulham; the Chequers; T. Armatage, in St. Martin's Lane; W. Rathery, in Petty France; J. Beech, Bow Street, &c.—Mr. L. Brock described several wall tiles of elaborate design from various excavations in London. These are of early seventeeth century date, and illustrated the extensive use of this system of decoration. A fragment of the rough pavement now being removed on the site of old Leadenhall Market was also exhibited. The pavement covers the whole of the site, and is a continuance of what was found last year over the site of the new Leadenhall Market.—Mr. A. C. Fryer contributed a paper on a pewter communion cup recently found at Cheadle Holme, supposed to be the same that was lost in 1672.—The second paper was by the Rev. C. Collier, and descriptive of a series of pit dwellings near Cedenham Park, brought to light by the progress of the excavations for the new railway. Several early interments were found.

ZOOLOGICAL SOCIETY.

Jan. 3.—Prof. W. H. Flower, President, in the chair.—Mr. W. A. Forbes made remarks on the horns of the prong buck (*Antilocapra Americana*) lately shed by the specimen living in the Society's garden. This was, it was believed, the first instance on record of the same individual having shed its horns in captivity in two consecutive years.—Letters and communications were read: from Prof. Owen, on Dinornis (Part XXIII.), containing a description of *Dinornis pavus*, a new species of about the size of the dodo, of which a very complete skeleton (now in the British Museum) had been lately discovered in a cavern in the province of Nelson, New Zealand,—from M. L. Taczanowski, on the birds collected by Mr. Stolzmann during his recent journey in North-Eastern Peru, with descriptions of some new species,—from Mr. M. Jacoby, on three new genera and fourteen new species of phytophagous coleoptera from various localities,—by Mr. O. Thomas, on the African mungooses (Herpestime), in which he reduced the described species of this group to nineteen, divisible into seven genera,—by Canon Tristram, on a new species of land-rail obtained at Ribè, East Africa, by Mr. R. C. Ramshaw, which was proposed to be named *Crex Suahilensis*,—and by Mr. W. A. Forbes, on the existence of a gall-bladder in, and on other points in the anatomy of, the barbets and toucans (Capitonidæ). The peculiar form of the gall-bladder in these birds, as well as other features in their myology now described for the first time, were stated to make the relationship of this group to the woodpeckers (Picidæ) still more certain than it had previously been from the observations of Nitzsch, Kessler, Garrod, and others.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

Jan. 10.—Dr. S. Birch, President, in the chair.—The Secretary's Report was read.—The following Officers and Council for the current year were elected: President, Dr. S. Birch; Vice-Presidents, Rev. F. Q. Cook, Rev. G. Currey, Sir H. S. Giffard, Right Hon. W. E. Gladstone, Sir W. Gregory, Right Hon. the Earl of Harrowby, Right Rev. J. B. Lightfoot, W. Morrison, C. T. Newton, Sir C. Nicholson, Rev. G. Rawlinson, Sir. H. C. Rawlinson, Very Rev. R. P. Smith, and Sir E. Wilson; Council, R. Bagster, Rev. C. J. Ball, Rev. Canon Beechey, T. Christy, R. Cust, Baron de Cossor, J. Fergusson, C. D. Fortnum, C. Harrison, Prof. T. H. Lewis, Rev. A. Lowy, J. M. Norman, F. G. H. Price, P. Le Page Renouf, J. Sidebotham, V. Stuart Rev. H. G. Tomkins, Prof. W. Wright, and Rev. W. Wright; Hon. Treasurer, B. T. Bosanquet; Secretary, W. H. Rylands; Hon. Secretary, A. Cates: Hon. Secretary for Foreign Correspondence, Rev. A. H. Sayce; Hon. Librarian, W. Simpson.

THE INSTITUTION OF CIVIL ENGINEERS.

Dec. 20.—Annual General Meeting.—Mr. Abernethy, President, in the chair.—The following gentlemen were elected as Council for the ensuing year: President, Sir W. G. Armstrong; Vice-Presidents, Mr. J. Brunlees, Sir J. W. Bazalgette, Sir F. Bramwell, and Mr. E. Woods; Other Members of Council, B. Baker, G. Berkley, G. B. Bruce, Sir J. Coode, E. A. Cowper, J. N. Douglass, A. Giles, H. Hayter, Dr. W. Pole, R. Rawlinson, A. M. Rendel, Dr. C. W. Siemens, D. Stevenson, Sir W. Thomson, and Sir J. Whitworth.

Jan. 10.—At the Ordinary Meeting on Tuesday, the 10th of January, Sir W. G. Armstrong, C.B., F.R.S,, delivered an Inaugural Address as President. He observed that it had been the practice of his predecessors in the chair to select topics for their address that had reference to branches of Engineering which operated to increase the productiveness of human industry, and there were many who would contend that all Engineering efforts ought to centre upon that object. It might be fully admitted that the general amelioration of the material condition of the world was the noblest object of Engineering science; and if men and nations ceased to be bellicose and rapacious, such would naturally be the direction which all Engineering practice would take; but this was a world of contention, where no individual State could insure its independence, and carry on its industrial occupations in safety, without protecting itself against the possible aggression of its neighbours. Thus it was that the science of the Engineer was invoked for the purposes of war as well as for those of peace; and it was probable that the Engineering element would in future enter more and more largely into the operations of war, until the issue would be chiefly dependent upon the superiority of mechanical resource displayed by one or other of the contending parties. There was no country in the world less disposed to be aggressive than our own, but there was none so likely to incite the greed of an assailant, or so vulnerable in relation to its commerce. War indemnities had degenerated into mere exactions proportioned to the wealth of the vanquished; and England, being the richest of nations, offered the highest premium for successful attack. As to commerce, England had more than one-half of the ocean carrying trade of the whole world in her hands, and her ships, swarming over every sea and conveying merchandise of enormous value, would, in the event of war, invite the depredations of hostile cruisers. We had seen in recent years what ravages a single armed ship could inflict upon a mercantile navy incomparably smaller than our own, and, in our case, it was not only property, but indispensable food that was at stake. The ever increasing population of Great Britain had already far out-grown its internal means of support, while the increasing cheapness of imported food so discouraged native agriculture, that we might expect our future dependence upon foreign supply to increase even more rapidly than our population. This was not the occasion to discuss either moral questions affecting war, or political questions concerning free trade. We had the stern fact before us that national defence was in our case peculiarly a necessity, and the question how it could best be effected, from an Engineer's point of view, was a legitimate subject for this address. England must always be chiefly dependent for security upon her naval power, but we could not hope that she would ever again be so dominant at sea as before the introduction of steam navigation. So long as naval superiority depended upon seamanship and an unlimited supply of sailors, no nation or combination of nations could compete with us; but as soon as it became established that fighting-ships could be manœuvred with more certainty and precision by the power of steam than by the power of wind, a revolution began which had gradually made naval warfare a matter of engineering rather than of seamanship. The introduction of rifled ordnance and percussion shells was the second step in this revolution, and had the effect of condemning as useless the whole fleet of wooden ships with which all our victories had been won, and which were the pride of the nation. Then commenced that contest between guns and armour which had gone on to this day, and had not yet been decided. Nor would it, in all probability, ever be decided, seeing what an *ignis fatuus* finality was. The most recent stage of this revolution was that marked by the introduction of torpedoes, against which our ponderous ironclads were no more secure than ships of thinnest iron. These constantly-changing phases of attack and defence had placed our naval authorities under extreme difficulty in deciding upon questions of ships and armament. To stand still was impossible, while to act upon uncertain data was sure to lead to mistake. The necessary consequence had been that types and patterns of ships had been continually changing, and vessels, costing vast sums of money. had become nearly obsolete almost as soon as made. We could not wonder that, so long as invulnerability was conceived to be attainable. great sacrifice should be made for its accomplishment; but with our present knowledge, which it would be unfair to apply to a criticism of the past, we might feel assured that invulnerability was a chimera. Not only did we see that armour was unavailing against torpedo attack and ramming, but we were justified in concluding that every attempt to increase resistance to projectiles would be quickly followed by a corresponding increase in the power of artillery. Our early ironclads, like the Warrior, were plated all over with armour 4½ inches thick—a thickness which could now be pierced with field-pieces. To resist the most powerful guns now afloat, armour of at least 2 feet in thickness was required; and in order to reconcile the constantly increasing thickness with the weight which the ship was capable of carrying, it it had been necessary to restrict the area of armoured surface to ever narrowing limits, leaving a large portion of the ship without protection. In those magnificent and tremendous vessels which the Italians were now building, the armour would be withdrawn from every part except the battery, where guns of 100 tons would he placed, and where the armour would be confined to a narrow belt of great thickness. Everything of importance that projectiles could destroy would be kept below water-level, and, so far as artillery fire was concerned, the ships would be secured against sinking by means of an under-water deck and ample division into compartments. Armour therefore seemed gradually contracting to the vanishing point; but, until it actually disappeared it was probable that no better application of it could be made than had been decided upon by the acute and enterprising naval authorities of Italy for the great ships they were now constructing. The dread of the terrible effects of the fragments of shells bursting amidst a crowded crew, and the apprehension that the smoke from the explosion, when it occurred between decks, would paralyse the service of the guns, had conduced more than anything else to the adoption of armour. Methods of avoiding or lessening these dangers, otherwise than by the use of armour, had been little considered; yet the alarming aspect of the case was greatly altered when we reflected that, by the application of mechanical power, to do what had hitherto been done by a multitude of hands, the exposure of a crowded crew could be avoided, and also that the guns might all be mounted on an open deck, where the smoke from shells would speedily clear away. As to the comparative liability of an ironclad and an unarmoured ship to be sunk by projectiles, there was much less difference between them than was generally supposed; becaused the unarmoured ship, though freely penetrable, might be so constructed that the entrance of water by perforation would not extensively flood the ship, unless it took place at a great number of critical places. Indeed, by introducing an under-water deck, with divisional spaces, and by the partial application of cork, as in the Inflexible. for displacing influent water, and thereby preserving stability, and also by a proper distribution of coal for the same purpose, an unarmoured ship might be rendered almost incapable of being sunk; and it was rather surprising that so little attention had been directed to the attainment of that object. It was not too much to say that, for the cost of one ironclad we could have three unarmoured ships of far higher speed, and carrying collectively three armaments, each equal to that of the armoured vessel. It might be asked. Which would be the better investment? If it were imagined that the three were matched in combat against the one, it would be perceived that, in addition to their numerical superiority, the former would possess many advantages. Being smaller, they would be more difficult to hit. Being swifter, they could choose their positions, and be free to attack or retreat at pleasure. Being more nimble in turning, they would be better adapted both for ramming and for evading the ram of their adversary. Finally, the conditions of superior speed and agility would favour their use of torpedoes and submarine projectiles; although it was a question whether, for the sake of a much needed simplification, it would not be better to confine that species of attack to separate vessels specially constructed for that one particular purpose. Even if the utmost advantage she could possess were conceded to the ironclad, viz., that of being impenetrable by the guns of her opponents—she could not prevail in a contest of three agatnst one, unless by the use of securely-protected artillery she could keep her assailants at bay, and gradually destroy them by her fire if they persisted in their attack. Such might be the issue if the allied vessels had nothing but guns to oppose to guns: but they would naturally under such circumstances, place their men below, out of the reach of projectiles, and then attack with their rams or torpedoes. With the crews in safety, it was scarcely possible that unarmoured vessels, with under-water deck and all their machinery beneath, should suffer any disabling injury by being pierced in a few places by either shot or shell. But take the much more probable alternative of the armoured vessel being penetrable by the guns which would be used against her. In that case her enemies might elect to make the contest one of artillery. On their part, armour-piercing projectiles would be used which, on penetrating the thick sides of the ironclad, would carry inboard a mass of broken material far larger in quantity than the fragments of the shells with which they would be assailed, and quite as destructive in effect. The ironclad would have to sustain the converging fire of three ships, each carrying the same armament as her own, and her swift and nimble adversaries would steam round and round her, directing their fire on the most vulnerable points, and ever ready to seize a favourable moment to dash in and finish the contest by ramming. In either case, therefore, the ironclad would be over-matched by a combination of unarmoured vessels representing the same pecuniary value. Without entering into technical questions concerning fleet-fighting, it seemed reasonable to believe that the result would be the same if the number engaged on each side were proportionately multiplied. Inferiority of speed and of number would still give the choice of position, and secure the advantage of converging fire, besides which the greater power of division and of concentration must always belong to the most numerous fleet. But if ironclads were not needed for the purpose of opposing ironclads, it was difficul to see for what purpose they were wanted at all. For every other kind of service, a numerous fleet of smaller and swifter vessels, unencumbered with armour, would clearly be preferable. To protect our commerce, to guard our extensive seaboard against invading flotillas, to lend naval assistance to our colonies in case of need, and generally to maintain our supremacy at sea, we required a far more numerous navy than we possessed or could afford to possess unless we vastly reduced our expenditure on individual ships, and to do this we must dispense with armour. It might, perhaps, be rash entirely to abandon armour so long as other nations continued to use it, because nothing but the experience of an actual war would remove all question as to its possible utility; but considering the indisputable value of a numerous fleet of swift and powerfully-armed ships. built with a view of obtaining the maximum amount of unarmoured defence, and considering that such vessels, unlike armour-clads, could never grow much out of date, it did seem to be expedient that the chief expenditure of this country should be upon ships of that description. Lightness should be the special aim in the construction of such vessels. Steel plates should be used for the hulls, and guns and engines should be of the least possible weight consistent with the necessary power. Every ton of weight saved would enable higher speed to be attained, and there was probably no quality in a fighting ship which would so much develop in importance as that of swiftness. Messrs. Thornycroft had led the way in showing what extraordinary speed could be realized in diminutive vessels, by reducing to the utmost the weight of every part of the structure and its contents; and although we could not expect to attain proportionate speed hy the same method in ocean-going ships of war, yet there could be no question that we might have far swifter ships than at present if lightness were made the principal object, instead of the prevalent practice of loading ships with cumbrous armour, in the vain hope of rendering them invulnerable. Light unarmoured ships, designed by Mr. George Rendel, had lately been built in this country for foreign powers, which, with a displacement of only 1,800 tons, had attained a speed of 16 knots an hour. They carried coal for steaming 4,000 miles, and had already actually steamed 3,500 miles without replenishing. They were each armed with two 10-inch new-type guns, which had nearly an all-round fire, and were capable of piercing 18 inches of iron armour; and with four 40-pounders on the broadsides. It was a very serious question what could be done in the event of a number of such vessels as these being let loose upon our commerce. At present there was not a single ship in the British navy carrying an armament competent to engage them, that could overtake them in pursuit, or evade their attack when prudence dictated a retreat. Confidence was often expressed in our mercantile marine being capable of furnishing, on an emergency, a supply of vessels fit to be converted into cruisers; but where were there to be found amongst trading or passenger steamers, vessels possessing a speed of 16 knots, with engines and boilers below water-level, and having an under-water deck to save them from sinking when penetrated by projectiles at or below the water-line? From his own experience he knew how difficult it was to adapt mercantile vessels to the purposes of war, and how unsatisfactory they were when the best had been made of them. It was alarming to think how unprepared we were to repress the ravages which even a small number of swift marauding vessels, properly constructed and armed for their purpose, could inflict upon the enormous property we had at all times afloat, and how little we could hope to clear the sea of such destructive enemies, by cruisers improvised out of ready-made steamers destitute of all the conditions necessary to render them efficient for such a service. It must ever be borne in mind that it was not merely the loss of property and interruption of trade that we had to fear, but also the interception of food supplies; and that the more our population increased and our agriculture declined, the more terribly effective for reducing us to submission would be the stoppage of those supplies. The President then adverted to harbour defence. He pointed out that many of our ironclad forts had already outlived the stage of artillery progress for which they were adapted. He expressed his opinion as to the best method of rendering large guns effective in shore batteries. He dwelt upon the value of gunboats, considered as floating gun-carriages, and used in combination with torpedo craft and submarine mines; all of which, he suggested, might be committed to the management of trained naval and engineer volunteers resident on the spot. He said it would be a grand development of the volunteer movement, of which this country was so justly proud, if it were thus to be extended to harbour defence; and he was informed that, so far as the use of submerged torpedoes was concerned, a project of intrusting their employment to a corps of volunteer engineers was already under consideration. The superior education and intelligence of the class from which our volunteers were mostly supplied would especially fit them for the discharge of duties involving skill and discretion, such as would be required in the handling of electrical apparatus, and we might be sure that, wherever dash was needed in the use of torpedo-boats, there would be no lack of that quality amongst volunteers in the hour of trial. On the subject of artillery he described the progress of gun-manufacture since the introduction of rifled ordnance, prior to which a gun was simply a tube of cast iron or bronze closed at one end. He also discussed the question, what, under the present condition and prospects of steel manufacture, should be our practice as to the use of that material for artillery purposes. He was then led to speak of a system of construction which had not passed through the experimental stage, but which, from the results it had already given, promised to attain a wide application. He referred to that system in which the coils surrounding the central tube consisted of steel wire, or ribbons of steel, wound spirally upon the tube. To those who objected to welded coil tubes on the ground of supposed deficiency of longitudinal strength, this mode of construction must appear especially faulty, inasmuch as lateral adhesion, instead of being, as contended, merely deficient, was altogether absent; while to those who advocated the present coil system, this variety must commend itself as affording the greatest possible amount of circumferential strength that could be realised from the material employed. Steel in the form of wire, or drawn ribbon, possessed far greater tenacity, and also greater toughness, than in any other condition, and in applying it to guns there was command of the tension with which each layer was laid on. He then alluded to the labour of those who had worked in this direction, and referred to a 6-inch breech-loading gun of this construction made at Elswick, and tried in the beginning of 1880. He stated that the charges used with it were large beyond precedent, and the energies developed proportionately high. Being satisfied with the results obtained with this gun, a second one of larger dimensions had been commenced, and was now finished. Its calibre was 26 centimetres or about 10¼ inches. Its length was 29 calibres, and its weight was 21 tons. In the previous gun he depended for end strength upon the thickness of barrel only; but in the new one, layers of longitudinal ribbons were interposed between the coils, in the proportion of one longitudinal layer to four circular layers. The longitudinals were secured to the trunnion ring at one end and to a breech-ring at the other, and were in themselves calculated as sufficient to resist the end strain on the breech, independently of the strength afforded by the tube. The whole was encased in hoops shrunk upon the exterior of the coil, for the treble purpose of protection from injury, of preventing slipping in the event of the failure of an external strand, and of adding to the strength of the gun. This gun had already been tried, and had given results which, in relation to its weight, were unexampled except by its 6-in. predecessor. Various attempts had also been made abroad to reduce this system to practice, and it was understood that the French were at present engaged in making experimental guns upon the same general principle. With regard to the ribbon form of section, he preferred it to a square section of equal area, as being more favourable for bending over a cylinder, but any rectangular form was better than round wire, on account of the flat bedding surfaces it afforded. He then discussed the subject of breech-loading and muzzle-loading, and the various forms of rifling. He also described the many changes that had been found necessary in the form and manufacture of powder for heavy ordnance, and the difficulties which still remained to be overcome. As to the mounting of guns in forts and ships, he remarked that the difficulties of the problem were much greater than was commonly supposed. It was certain that machinery could no longer be dispensed with for working the guns, and that engine-power must be used to economise labour and avoid exposure of the men. In the days of cast-iron smooth bores, the heaviest naval gun weighed 95 cwts., and it was deemed impracticable to exceed that limit in a ship. At the present time the heaviest naval gun in the British service was 80 tons, and guns of 100 tons were carried in Italian ships. Instead of projectiles weighing as a maximum 94 lbs., and charges of 16 lbs., we had now to handle projectiles of 1,500 lbs., and charges of 450 lbs.; and to keep pace with foreign navies those limits of weight must be greatly exceeded. Even if it were possible to deal with guns and ammunition of such weights by manual labour the multitude of men required for the purpose would be greater than could find standing room at the guns. Up to a certain point hand-power might be so aided by machinery as to enable larger guns to be worked by men than was formerly deemed possible; but the mechanism required to render hand-labour available was quite as liable to be disabled by an enemy's fire as that which would be applied in connection with engine-power. There was therefore no reason in this respect for employing a numerous gun-crew in preference to inanimate power. Automatic methods of running out the gun, by which the gun was lifted in recoiling by slides or radius bars, and recovered its position by gravitation, might in many cases be advantageously used to save labour, but in a ship the varying inclination of the deck interfered with uniformity of action. The upward motion of the gun also involved the objection of a higher port, and it added greatly to the downward shock, which became very severe on the deck where the guns were large and were fired at considerable elevation with such heavy charges as were now usual. Steam power, acting through the medium of hydraulic pressure, was already largely applied in recent ships for effecting all the operations of working the guns, and where such power was used there was nothing to gain by automatic action for returning the gun into firing position. In considering these various mechanical arrangements now applicable to naval warfare, we perceived the growth of the engineering element in our ships of war, and the importance of mechanical, as well as nautical, acquirements on the part of the officers, as also, in a less degree, on that of the men. Breech-loading guns, carriages fitted with all modern appliances, shot and powder lifts, mechanical rammers, and torpedo apparatus, all combined with steam or hydraulic, machinery, or with both, constituted mechanisms requiring to be supervised by officers qualified as engineers, and to be handled by men trained in the use of machinery. Before drawing to a conclusion he would advert to a subject of grave national importance. Our navy was at present armed with guns which could not be expected to contend successfully with the best modern guns that could be used against them. Happily, most of the older ships of foreign powers were in the same predicament; but all their new vessels, and some of their older ones, were being armed with artillery which, weight for weight, was far superior in power to that of our navy. Our service guns had simply been overtaken in that rapid progress of artillery which had been going on for the last eight or ten years; and it might be doubted whether any partial remodelling during that period would have averted the present need of re-armament; while it would certainly have involved great sacrifice and confusion of ammunition and stores. But a new departure could not longer be delayed. An irresistible demand had arisen for breech-loading guns, and it was imperative to combine, with the introduction of that system, such other modifications of construction as would realise the increase of power which we now knew to be attainable. It might, however, be asked, What better prospect of finality there was now than we had ten years ago? As to absolute finality, it would probably never be reached, but the country might take some comfort in the reflection that every stage of progress narrowed the field for further development. There was already no substantial room for improvement in the accuracy of guns; and as to power, we were nearly approaching the limit at which severity of recoil and extravagant length of gun would prohibit further advance. We might go on building larger guns almost without limit, though he doubted the policy of so doing, but mere increase of size did not revolutionise system. There seemed, therefore, to be more hope of permanency now than at any former period; but, whether this were so or not, we could not, wtth danger, remain passive. What, then, should our Government do in regard to the great work of re arming the fleet? He took it for granted that all new ships would be armed with the best guns that could be now made, and that the more important of the older vessels would speedily receive the same advantage; but beyond this, so long as experience of novelties was deficient, it was a case for cautious procedure. In the meantime, no expense should be spared in judicious experiments, seeing that the expense of experiments was trifling in comparison with that of mistakes. Above all, the Government should pursue such a course as would bring into full play the abundant Engineering resources of this highly mechanical country, for increasing the efficacy of our National Defence. It was announced that the Council had recently transferred Messrs. C. B. Braham, J. Forrest, and T. H. Riches to the class of Members; and had admitted twenty-three gentlemen as Students.—At the monthly ballot Messrs. T. H. Gibbons and G. F. Thomas were elected Members; and Messrs. J. E. A. J. Blandy, H. Ewart, I. Ishiguro, J. Lynch, J. Osborne, and H. G. Sumner Associate Members.

RECENT AMERICAN AND FOREIGN PATENTS.

An improved buckle for use in securing the ends of straps without sewing or rivets, and especially useful in attaching parts of harness, has been patented by Messrs. James W. Sweyea and William H. Lowe, of Walla Walla, W.T. The invention consists of a two-part box buckle, each part being of tubular form and provided with a wedge-shaped tongue. These tongues serve to hold the ends of the strap or straps in between them and enter respectively the box part of the other, and are formed with pins which engage with holes in the strap ends. One of these tongues is hinged to give room for insertion or removal of the ends of the strap, and is provided with a spring catch to hold the two parts of the buckle together when closed. Any strain on the strap tends to draw the two parts of the buckle more tightly together.

A very compact and useful improvement upon *baby jumpers*, which mothers and nurses will be able to appreciate, has been patented by Mr. Wesley Roberts, of Martinsville, Ill. The invention consists of a baby jumper which is readily convertible into a small table, and which, when extended to adapt it to its primary use, forms a very stable device for the child to jump, whirl, or swing upon with perfect safety. To these ends or purposes the spring pole of the jumper is hinged midway of its length to admit of its being folded into a contracted space and horizontal position. The support within which the pole plays, and which is provided with a pole-sustaining spring, is also hinged to fold up, the platform, which is removable and forms the table top, rests upon a sliding extension, and hinged wings or supports are provided to give an extended base support to the whole structure.

Mr. David Britton, of Jonesborough, Ill., has patented a *fruit drier*, which has superior drying facilities, and offers increased conveniences for inserting, changing, and removing the fruit. It consists of a drying house having a separable strip in its roof to provide for the escape of the moist air, and to promote circulation of the heated air, a furnace for heating the incoming air, guiding, and distributing plates for the air, at the sides of and above the furnace, a series of tracks or ways on opposite sides of the interior of the drying house and arranged one above the other to support tiers of drawers which hold the fruit to be dried, and separable end frames having crossbars and hinged doors to provide for the entry and removal of the drawers with very little waste of heated air.

Mr. Isaac S. Bates, of Minonk, Ill., has patented an improved fender attachment to *cultivators*. In this improvement the beam of the cultivator has combined with it a laterally adjustable clamping plate having upper and lower eyes, and united by screws with a clamping plate on the under side of the beam. Through these upper and lower eyes, a rod capable of being raised or lowered is passed and pivoted at its lower end to the upper middle portion of the fender, which is connected at its end by a hooked rod with the axle or frame of the cultivator. This construction not only admits of a lateral adjustment of the fender in both directions, but also of its vertical adjustment, to suit the height of the corn or other plants in the row, and it has a free connection with the rod which provides for its vertical adjustment. Although here only one beam is referred to, the invention is of course applicable to the series of beams in a wheel cultivator.

Mills.—Messrs. John H. Houston and David H. Houston, of Cambria, Wis,, have patented an improved hurdle for fanning mills. The object of this invention is to insure a more thorough separation of the grain and the chaff in a fanning mill. Hurdles for fanning mills, as heretofore made, have been defective in the construction of the frames or slides of their sieves, which have been straight on their lower or inner edges, thereby not providing for a proper filling of the sieves at their sides and angles and permitting the light grain and chaff to drop through the hurdle among the clean grain. This is caused by the greater or more rapid movement of the grain in the middle than at the sides, whereby the grain passes down the sieve on a curved line or front. The present invention obviates this and causes the grain to pass down the sieve in a straight line, all the grain moving at the same rapidity and completely covering the sieve. This is effected by making the lower edges of the screen frames and feed slides concave. An upper sliding feed board thus constructed is arranged above the uppermost inclined sieve, also an inclined slide below the lower sieve, and whereby the grain is made to pass over the entire width of the sieve of the screenings box, thus more thoroughly cleaning the grain.

A *Bag Fastener*, which is operative without the aid of locking devices, has been patented by Mr. John B. Batt, of Williamsville, N.Y. The device consists of an oblong metal loop or band, having one end expanded into a larger curve than the other, to serve as a handle and to facilitate the insertion within the band of the mouth of the bag. It is applied by drawing a portion of the mouth of the nearly filled bag into the loop and placing it against the edge of the smaller end of the latter, so that the hem of the bag rests upon the upper portion of the rim, and afterward gradually drawing the remaining portion of the mouth through the enlarged portion of the band till the entire mouth is equally distributed in gathered folds along and within the band, when the upper edge of the rim of the band will engage with the hem of the bag and prevent the mouth from slipping out. The device may be disengaged by emplying force to withdraw a portion of the hem at the mouth end of the bag.

Sewing-machine Needles.—A simple improvement so that the needle can be threaded very easily and quickly even by those having perfect eyesight, has been patented by Mr. Amos F. Gerald, of Fairfield, Me. The needle is formed with a slit extending from a little below the eye, along one side of the latter, and upward to a point above the part of the needle that works through the goods, where it passes out at the side of the needle, thus forming an inclined splint, which has its upper end set outwardly. A sleeve inclined at the inside of its lower end is fitted over the needle to receive within it the upper end of the splint. This sleeve, which has its motion in direction of the length of the needle, controlled by a pin and slot, is formed with opposite notches in its lower edge, so that to thread the needle it is only necessary to draw the thread across the splint and press it upward against the lower edge of the sleeve to slightly raise the latter, and so that the thread will enter the notches and pass over the point of the splint, after which it is drawn downward through the slit until it enters the eye of the needle.

Mr. Oren Stoddard, of Busti, N.Y., has patented a combined *hand seed planter and fertilizer distributer*, which has a very perfect action and separates the fertilizer from the seed in the ground. In this device a central box in which phosphate or other fine fertilizer is placed has combined with it outer side boxes for reception of the corn or other seed. Followers terminating in or connected with a handle above, serve, by a suitable construction of the interior of the boxes, to discharge, as they are thrust downward, the fertilizer and seed in measured quantities into the ground, the same passing out through or between elastic plates which form the necessary openings in the soil, while the bottom of the boxes act as a stop to insure the seed being planted at a uniform depth. By this construction the seed for each hill will be divided, and the fertilizer will be deposited in the space between the parts of the hill without being in contact with the seed, so that the seed will not be injured or killed by the fertilizer. Connected with the fertilizer follower are levers, having attached covering plates which, as said follower is drawn upward, force the soil into the openings in which the seed and fertilizer have been deposited, and cover the seed.

An improvement in cultivators, patented by Mr. Johann C. F. Hammer, of Cullman, Ala., has no small amount of merit. The object of this invention is to furnish cultivators so constructed that the ploughs can be adjusted to keep them parallel with the line of draught. To this end the standards of the ploughs which are connected with the side beams are journaled at their upper ends to turn in said beams and secured by clamp nuts at their tops, and the braces of the ploughs are bent to one side at their upper ends and there notched, and pass through eyebolts which project up through the side beams, and are held by clamp nuts on the tops of said beams. With this construction, by loosening the clamp nuts of the standards and braces of the ploughs, the latter can be adjusted parallel with the line of draught whatever be the inclination of the side beams, so that the ploughs will always work squarely in the ground.

Mr. King G. Streeter, of Littleton, N.H., has patented a very neat and durable *glove fastening*. In this device a tubular shank, having an eye on its outer end, is secured to the glove on one side of the wrist opening. Through this eye is loosely fitted a wire bent in reverse directions at its opposite ends, which latter have knobs that prevent the wire from dropping out of the eye. In using the fastener one end of the wire is passed through the buttonhole in the glove wrist, and said rod or wire then used as a lever to draw the parts of the glove wrist together. The other end of the rod is next passed through the buttonhole, and the rod afterward adjusted to bring its central portion within the eye. The buttonhole is fitted with an oblong eyelet to prevent the glove wrist from being worn or torn around the buttonhole.

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